Vivian Li

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EDUCATION

University of Colorado Boulder / August 2023 – present
Ph.D. student in Computer Science & Interdisciplinary Quantitative Biology
Advised by Dr. Aaron Clauset (CSCI) & Laura Dee (EBIO)

Cornell University / August 2016 – May 2020
B.A. in Information Science & French, Minor in Computer Science
Cumulative GPA: 3.88

RESEARCH STATEMENT

I'm interested in predicting ecosystem response to disturbances, such as those driven by climate change or human activity. Using dynamic models and computer simulations, I analyze ecological networks to understand how feeding and non-feeding species interactions shape ecosystem structure and resilience. My work bridges both biology and computation, and I'm committed to interdisciplinary approaches that use tools from computer science to answer ecological questions.

GRADUATE RESEARCH

Predicting Ecosystem Recovery Trajectories / 2023 – present

- Simulated ecological disturbances and recovery dynamics using the allometric trophic network model and synthetic ecological networks
- Analyzed how ecosystem structure and feeding/non-feeding interactions influence recovery trajectories

Identifying Structural Variants in the Human Genome / 2024 – present

- Developed a statistical method to distinguish ambiguous structural variants
- Demonstrated superior model performance on synthetic sequencing data
- Identified hundreds of novel variants using both short- and long-read sequencing data from the 1000 Genomes Project samples

Modeling Tau Spread Across a Neuronal Network / 2024
Advised by Dr. Dan Larremore & Dr. Roy Parker

- Created a network-based model of the brain to analyze how structural connectivity influences the spread of misfolded tau proteins in neurodegenerative disease
- Simulated the effects of therapeutic interventions to assess their potential to prevent or mitigate disease progression

Modeling the Evolution of Social Foraging Behavior / 2023
Advised by Dr. Mike Gil

- Built an agent-based model to simulate the evolution of traits linked to social foraging behavior in animal populations

WORK EXPERIENCE

Uncountable / March 2020 – March 2022
Full Stack Engineer

- Improved the Uncountable platform through additions and modifications to all pages across the platform, responding to customer asks and improving the code quality and web design of the platform, in React
- Designed numerous API endpoints to add complex functionalities and improve AI tools for user interactions across the platform, in Python and PostgreSQL
- Designed and implemented an inventory management system and a series of visualizations for our AI tools, and managed the platform's project notebook through UI design and code review

NASA Jet Propulsion Laboratory / June 2019 – August 2019
Frontend & Software Developer Intern, Mars 2020 Mission

- Developed a frontend application to simulate the drive and camera views of the Mars 2020 Rover in a 3D animation upon user input of rover commands, in React
- Simplified the process for users to plan, execute, and verify command sequences in uplink by implementing a live text editor, three.js 3D simulator, and data table into the application
- Worked with various APIs and AWS to run backend computations and deploy the application, and implemented and modified node packages such as react-redux and react-ace

LEADERSHIP AND TRAINING

Mentor with DPS Coach Mentoring, Women in STEAM Cohort / 2024 – present
Graduate Student Mentor / 2024 – present
Teaching Assistant for Introduction to Web Design & Programming / 2018 – 2019
Teaching Assistant for Intermediate Web Design & Programming / 2019 – 2020

UNDERGRADUATE RESEARCH

Guimbretière Design Lab / September 2019 – May 2020

- Developed a robotic system to remotely control the movement of a Beam telepresence robot using data collected from an XBox Kinect that tracks user movements and gaze, using ros
- Implemented robot mapping and obstacle avoidance with the use of a camera and infrared sensors, and designed hardware modifications to the original Beam robot

Batt Lab / April 2017 – September 2017

- Developed and tested protocols for the identification of various fungal and bacterial samples shipped to the lab from domestic and international clients

SKILLS

Programming/Scripting Languages: Python, R, C++, Java, SQL, Bash
Libraries and Frameworks: numpy, pandas, matplotlib, scikit-learn, PyTorch, Tensorflow, ggplot
Web Development: JavaScript, Node, React, Vue, HTML, CSS, PostgreSQL, PHP
Other: High-performance computing

PUBLICATIONS AND PRESENTATIONS

Li, V., Chowdhury, M., Layer, R. M., & Clauset, A. *SVeperator: A Statistical Framework for Resolving Merged Structural Variants*. Manuscript in preparation, expected submission May 2025.

Li, V., Li, H., Staller, M., Clauset, A., Barner, A., & Dee, L. *Accounting for Non-Trophic Interactions is Key for Predicting Ecosystem Recovery*. Talk to be presented at the **ESA Annual Meeting**, August 2025.

AWARDS

NSF NRT Fellow / 2023 – 2024
Cornell Dean's List / 2017 – 2019
Carolina Corson Prize in French Philology and Literature (2nd place) / 2019

OTHER

Kona's Earthly Delights / January 2023 - April 2023
Farm Apprentice

- Assisted with harvesting, weeding, and farm maintenance, contributing to the farm's productivity while learning about organic farming techniques
- Managed a booth selling organic produce and farm products, engaging in direct customer interactions and promoting sustainable agriculture

Pacific Crest Trail / April 2022 - September 2022
Successful solo hike of 2653 miles over 5 consecutive months

City Farmer / September 2020 – December 2022

- Aided the development of the City Farmer urban garden in Vancouver, Canada through maintaining the garden, providing tours to the public, and educating visitors on composting

Cornell University Sustainable Design (CUSD) / September 2017 - December 2019
Currents Team CS Lead, Software Developer

- Created an application that controls the HVAC systems of single occupancy rooms on campus for optimal energy usage
- Managed the Computer Science team in the development of the mobile application, prediction algorithm, and server
- Implemented the server that processes and outputs the prediction algorithm data to a microcontroller controlling the HVAC system, using Node.js
- Designed the prediction algorithm which takes input stored in a PostgreSQL database such as location, calendar, and motion sensing data, and predicts when the system should be on or off for each user's room

The Research Paper / August 2017 - May 2018
Design Editor

- Designed and created the bi-annual The Research Paper publication featuring articles on student research across campus, using Adobe InDesign and Photoshop